



## Virtual Aeronautics Exploration

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Revision: 05

### Project Objectives

- Develop a 3D immersive application to visualize and increase understanding of aeronautics principles, an extension of those principles gained from prior study with FoilSim and RocketModeler.
- Develop lesson plans for aeronautics education that incorporates 3D immersive components.
- Determine principles and guidelines for lesson plans incorporating 3D immersive visualization.

### Sample Use Cases

- Students having just designed an airfoil in FoilSim deploy the new virtual wing in an immersive environment and observe its performance and aerodynamic effects in 3D.
- An independent-study student, having just designed and tested a rocket in RocketModeler, deploys the rocket in an immersive environment and observes its performance based on the speed and direction of the wind.
- Educators creating lesson plans that incorporate 3D immersive tools rely on NASA guidelines available via web download.

### Customers

- Intermediate school and high school students.
- Museum and traveling-exhibit patrons and curators.

### Deliverables for Phase 1

- Three to five comprehensive and high-quality lesson plans that lead the user through basic understanding of selected aeronautics principles and 3D immersive visualization and interaction with them.
- An immersive 3D application that helps students visualize and internalize aeronautics concepts that can be best taught in 3D. The application executes on desktop computers and scales to immersive CAVE hardware/software equipment.
- Guidance and principles for incorporating 3D immersion in science lesson plans.

### Milestones for Phase 1

	When	What	Confidence
ET.2-L.2-VAE.1	1 Feb '03	Lesson plan topics and outlines	Green
ET.2-L.2-VAE.2	1 Mar '03	3D application spec's and requirements	Green
ET.2-L.2-VAE.3	1 Jun '03	3D aeronautics visualization application	Green
ET.2-L.2-VAE.4	1 Aug '03	Final lesson plans	Green
ET.2-L.2-VAE.5	1 Sep '03	Lesson plan guidelines	Green

### People

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### Partnerships

- FoilSim aerodynamic simulation project
- RocketModeler simulation project
- GRUVE immersive simulation laboratory

### Technologies

- FoilSim aerodynamic simulation software
- RocketModeler simulation software
- GRUVE immersive 3D CAVE & software

### Quality Assurance

- Basic testing of application in local lab
- Beta testing by education partners

### Dependencies

- FoilSim and RocketModeler simulation application, project expertise and collaboration
- GRUVE lab participation
- Senior, expert educator to design and create lesson plans and lesson-plan guidelines

### Assumptions

- Principles appropriate for 3D, immersive visualization can be determined and selected from those taught with FoilSim and RocketModeler.